(12) **United States Patent**
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(10) **Patent No.:** **US 8,400,448 B1**
(45) **Date of Patent:** *Mar. 19, 2013

(54) **REAL-TIME LINES-OF-SIGHT AND VIEWSHEDS DETERMINATION SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 867 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/461,350**

(22) Filed: **Aug. 10, 2009**

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/292,786, filed on Nov. 26, 2008.

(60) Provisional application No. 60/992,343, filed on Dec. 5, 2007.

(51) **Int. Cl.**
G06T 15/00 (2011.01)

(52) **U.S. Cl.** **345/419**

(58) **Field of Classification Search** 345/419–428
See application file for complete search history.

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(57) **ABSTRACT**

A method for processing three-dimensional data that defines a three-dimensional scene, and determining and displaying lines-of-sight (LOS) and viewsheds on all visible surfaces of the scene, includes: i) assigning at a user-selected location at least one viewpoint in the scene; ii) applying ray tracing from locations in the scene to the viewpoint to determine locations in the scene that are in a line of sight (LOS) and outside the LOS of the viewpoint, thus determining the viewshed relative to the viewpoint while generating a set of color-coding information; iv) saving the set of color-coding information as a 2D texture image in graphics hardware memory; and v) compositing the 2D texture image over the 3D scene in a 3D window at a frame rate that enables real-time updating of the color coding as the scene is translated or rotated or the viewpoint is changed.

14 Claims, 11 Drawing Sheets
(6 of 11 Drawing Sheet(s) Filed in Color)